

# HOT-170: Chief Scientist Report

Chief Scientist: F. SANTIAGO-MANDUJANO  
HOT-170 Chief Scientist's Cruise Report  
R/V Kilo Moana  
June 13 - 17, 2005

Cruise ID: KM0513  
Departed: June 13, 2005 at 1030 (HST)  
Returned: June 17, 2005 at 0800  
Vessel: R/V Kilo Moana  
Operator: University of Hawaii  
Master of the Vessel: Captain Carl Christensen  
Chief Scientist: Fernando Santiago-Mandujano  
STAG Electronics/Deck Operations Technicians: Daniel Fitzgerald, Gabe Foreman

## 1. SCIENTIFIC OBJECTIVES

The objective of this cruise was to maintain a collection of hydrographic and biogeochemical data at the Hawaii Ocean Time-series (HOT) stations. Four stations were to be occupied during the cruise, in the following order:

- 1) Station 1, referred to as Station Kahe, is located at 21 20.6'N, 158 16.4'W and was to be occupied on June 13 for about 2 hours.
- 2) Station 2: ALOHA (A Long Term Oligotrophic Habitat Assessment) is defined as a circle with a 6 nautical mile radius centered at 22 45'N, 158W. This is the main HOT Station and was to be occupied for 3 days from June 14 to 16.
- 3) Station 51, is the site of the MOSEAN Mooring, located at 22 46.009'N, 158 5.533'W was to be occupied on the 4th day of the cruise for about 30 minutes.
- 4) Station 6, referred to as Station Kaena, is located off Kaena Point at 21 50.8'N, 158 21.8'W was to be occupied on on the 4th day of the cruise for about 2 hours.

A single CTD cast was to be conducted at Station 1 to collect continuous profiles of various physical and chemical parameters. Water samples were to be collected at discrete depths for biogeochemical measurements.

Upon arrival at Station ALOHA, two 200 m CTD casts were to be conducted to collect water for the gas array, followed by the subsequent deployment of a free-drifting sediment trap array, and by the deployment of the gas array. One net tow was to be conducted after the first 200-m CTD cast. The sediment trap array was to stay in the water for about 52 hours, and the gas array for about 24 hours. After this, a full-depth CTD cast was to be conducted, followed by 1000-m CTD casts at strict 3 hour intervals for at least 36 hours for continuous and discrete data collection, ending with another full-depth CTD cast.

One free-drifting array was to be deployed for 12 hours for incubation experiments on June 15.

A plankton net was to be deployed near noon and midnight on June 14 and 15 at Station ALOHA.

After CTD work at Station ALOHA was accomplished, the ship was to transit to recover the floating sediment trap array. After recovering the sediment traps, the ship was to transit to Sta. 51 to conduct a 200-m CTD cast and then to return to Sta. ALOHA to continue light cast operations. At the end of these operations, the ship was to transit to Station 6.

A near-bottom CTD cast (~2500 m) was to be conducted at Station 6 including salinity samples for calibration, after which the ship was to transit back to Snug Harbor.

A Profiling Reflectance Radiometer (PRR) was to be deployed for half-hour periods near noon time on June 13, 15 and 16.

A package including a Wet Labs AC9, a Chelsea Fast Repetition Rate Fluorometer (FRRf), and a SeaBird Seacat was to be used to profile the upper 200 m at Sta. ALOHA at noon time on June 15 and 16, and in the early morning on June 16.

The following instruments were to collect data throughout the cruise: shipboard ADCP, thermosalinograph, and two anemometers.

## 2. SCIENCE PERSONNEL

BEACH group:

Cruise Participant	Title	Affiliation
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Lucas Beversdorf	Graduate Student	UH
Karin Bjorkman	Research Specialist	UH
Susan Curless (Watch Leader)	Research Associate	UH
Allison Fong	Graduate Student	UH
Lance Fujieki	Computer Specialist	UH
Eric Grabowski	Research Associate	UH
Marcie Grabowski	Graduate Student	UH
Cecelia Hannides	Graduate Student	UH
Adrianna Harlan	Technician	UH
Anna Liem	High School Teacher	Punahou High school
Claire Mahaffey	Postdoctoral Researcher	UH
Blake Watkins	Marine Engineer	UH
Jonathan Watkins	Graduate Student	Jackson State U.

PO group:

Pollyanna Fisher	Undergraduate Student	UH
Paul Lethaby (Watch Leader)	Research Associate	UH
Laurie Menviel	Graduate Student	UH
Fernando Santiago-Mandujano	Chief Scientist (Res. Assoc.)	UH
Joseph Shacat	Graduate Student	UH
Joji Uchikawa	Graduate Student	UH
Mark Valenciano	Electronics Technician	UH

Others:

Courtney Fritz Graduate StudentUH  
Dale Hebel ScientistUH  
Lena Mobin Undergraduate StudentUH  
Robert Rember ScientistU. Alaska

### 3. GENERAL SUMMARY

Operations during most of the cruise were conducted as planned, with some changes in the schedule during the second day of the cruise. One 1000-m CTD cast within the 36-hr burst period had to be eliminated due to time constraints.

One 1000-m CTD cast was conducted at Kahe station. Eleven 1000-m CTD casts, two deep casts (~4740 m), and two 200-m casts were conducted at Station ALOHA. Two 200-m CTD casts were conducted near the MOSEAN mooring (Station 51), and near the ORS mooring (Station 50) respectively. One near-bottom cast (~2400 m) was conducted at station Kaena (Station 6).

The array of floating sediment traps, the primary productivity incubation array, and the gas array were deployed and recovered without incidents. All arrays drifted southwest.

C. Hannides completed successfully 8 plankton net tows.

C. Mahaffey conducted one net tow.

The PRR and AC9/FRRf were deployed as planned.

The Automated Trace-Element Sampler was successfully used to collect one trace metal sample.

The ADCP ran without interruption throughout the cruise, as well as the thermosalinograph, and the ship's two anemometers.

R. Rember tested successfully his bottle samplers by attaching them to the rosette frame during various CTD casts. His modules were independent and did not interfere with our regular operations.

D. Hebel collected his samples and conducted his experiments as planned.

Winds were easterlies at 15-22 kt during the cruise. A strong southwestward current was present during the cruise as indicated by the drift of the floating arrays deployed during the cruise.

We arrived back at Snug Harbor on June 17 at 0800. Full off-load took place immediately.

### 4. R/V KILO MOANA, OFFICERS AND CREW, TECHNICAL SUPPORT

The R/V Kilo Moana continues to maintain the excellent ship support for our work. The officers and crew were most helpful and accommodating. They showed enthusiasm and concern for our work and were very flexible in receiving changes in our operational schedule.

Technical support during this cruise was excellent. STAG personnel were available at any time to assist in our work and made things much easier for us.

## 5. DAILY REPORT OF ACTIVITIES (HST)

June 10, 2005; Loading Day

Equipment loaded during this day. CTD wire was re-terminated and CTD system tested.

June 13, 2005

The ship departed from Snug harbor at 1030, 1.5 hours late due to harbor traffic. Science meeting was conducted at 1145, followed by fire and abandon ship drills. Cruise activities were briefly reviewed, and safety issues were addressed.

Arrived to Kahe Station at 1300. A weight cast (400 lb) to 500 m was conducted.

The Profiling Reflectance Radiometer (PRR) was deployed at 1330

A 1000-m CTD cast was conducted at 1400. After the cast ended, the ship headed towards Station ALOHA, where it arrived at 2250.

After arriving at Station ALOHA, a 200-m CTD cast was conducted, followed by a net tow.

June 14, 2005

A second 200-m CTD cast was conducted at 0000 at Station ALOHA.

The sediment traps array was deployed at 0200. The array was deployed 3 nm south of the center since the MOSEAN and ORS mooring positions indicated southwestward drift.

The gas array was deployed at 0400, about 1 nm south of the center.

The first deep cast started at 0445, followed by the first 1000-m CTD cast of the 36-hr burst period at 1112. A total of five 1000-m casts were conducted this day.

In addition to the net tow conducted in the early morning, one more was conducted at 1000, another one at 1245, and one more at 2230.

One ATE sample was taken at 1110.

Easterly winds between 15 and 20 kt, with light drizzle in the morning.

June 15, 2005

Six 1000-m CTD casts were conducted on this day, finishing the 36-hr CTD burst period with a deep cast. The CTD cast scheduled for 0200 started one hour late due to difficulties locating the gas array. The recovery of this array planned for 0100 had to be postponed to 0500,

therefore the CTD cast scheduled for 0430 had to be cancelled. The gas array drifted 10 nm SW of ALOHA station.

The CTD cable got damaged within the traction winch after the recovery of the CTD cast at 1500. This happened when the rosette was already on board and the crane was being stowed, apparently because no tension was applied at the bitter end of the cable while the winch was operated. The damaged section was cut and the cable was reterminated before the following cast, the schedule was not affected.

The primary productivity array was deployed at 0600, 30 min later than planned due to the late recovery of the gas array. The array was deployed outside the ALOHA circle, near the location where the gas array was recovered. Since the gas array's buoy was used for this array, it was not necessary to stay close to it for its recovery, and the ship could return to the station to continue CTD operations. The array was located via ARGOS positions, and recovered without problems at 1900, the array drifted about 4.5 nm SW from its deployment position.

One PRR cast and one AC9/FRRf casts were conducted at noon time.

Two net tows were conducted at night and one during the day

Easterly winds 20-22 kt. Light drizzle in the morning.

June 16, 2005

The sediment trap array was recovered at 0600 without problems. The array drifted about 17 nm south of ALOHA.

One 200-dbar CTD cast was conducted at 0956 near the MOSEAN mooring, and another one at 1600 near the ORS mooring (Sta. 50).

One near-bottom cast was conducted at station Kaena at 2135.

One AC9/FRRf cast was conducted at 0300, and two more at noon time.  
One PRR cast was conducted at 1100.

One net tow was conducted at 1040 by C. Hannides, and one hand held net was deployed by C. Mahaffey for 20 min at 0640.

Easterly winds between 15 and 20 kt.

June 17, 2005

Arrived at Snug Harbor at 0800. Full off-load took place immediately.  
Sub component programs:

Investigator: Project/Institution:

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Bob Bidigare HPLC pigments/UH  
Mike LandryZooplankton dynamics/UH  
John DoreCO2 dynamics/UH

Ancillary programs:

Investigator: Project/Institution:

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Charles Keeling CO2 dynamics and intercalibration/SIO

Mark Abbott/Ricardo Letelier Optical measurements/OSU

Paul QuayDI13C and O isotopes/UW

Penny ChisholmProchlorococcus population dynamics/MIT

Ancillary research during this cruise:

Investigator: Project/Institution:

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Dale Hebel/Courtney Fritz/Formation of abiotic particles in oligotrophic

Lena Mobinmarine environment/UH

Jingfeng Wu/Robert RemberTest of new MITESS sampler circuit boards in

deep water/U. of Alaska

Claire Mahaffey/Allison Fong/Assessment of Nitrogen Fixation Rates/UH

Matthew Church